



Edmund G. Brown Jr.  
Governor

October 18, 2013

California Workforce Investment Board Executive Committee  
777 12<sup>th</sup> Street, Suite 200  
Sacramento, CA 95814

To: California Workforce Investment Board Executive Committee

Background and Work to Date

The Employment Development Department's Labor Market Information Division (EDD-LMID) has completed a pilot project and developed the first draft of a product titled "Regional Planning Information." The Regional Planning Information product is designed to identify and rank industry clusters and occupations as the largest sources of future job opportunities. The EDD-LMID designed the product to help identify investment priorities and assist in facilitating the commitment to data-driven decision-making among Local Workforce Investment Boards (LWIBs).

The EDD-LMID has begun working closely with Steve Levy to further shape the content, style, and format of the Regional Planning Information product. The EDD-LMID has also worked extensively in collecting feedback from LWIBs within the product's pilot areas to further improve the product. While the Regional Planning Information packet represents the latest version of the product, the EDD-LMID has planned multiple changes in accordance with the feedback we have received. Below is a summary of the planned changes:

- We intend to emphasize job opportunities in terms of future growth, in oppose to past growth, which will result in a change of emphasis on the bubble chart (page 1).
- We intend to include replacement job openings as well as those from job growth, knowing that replacements are now the largest share of opportunities and will continue to grow as baby boomers retire. This will result in a change of emphasis on the bubble chart (page 1) as well as changes to multiple tables featuring employment growth (pages 5 and 7-9).
- We intend to convene a group of technical experts and stakeholders to assist in defining the appropriate economic regions and industry cluster definitions as a foundation for this analysis. The region used for the Regional Planning Information product was only for pilot use.
- We intend to update EDD's projections to take account of the growth that has already occurred since 2010 and link to BLS's new industry and occupation projections that will be released in a month. This will result in changes to multiple tables featuring employment growth (pages 5 and 7-9).

- We intend to expand our analysis to include all community colleges in Santa Clara County, and use the same method to ensure that we identify every community college within each analysis area.
- We intend to replace the reference to "San Jose County" with "Santa Clara County" (page 14, map).

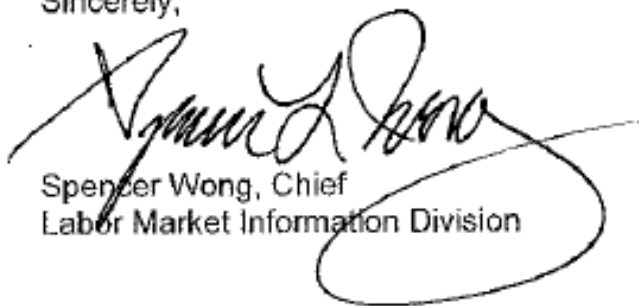
#### Project Goals

The Regional Planning Information product is intended to provide a foundation for economic and workforce analysis to help LWIBs with data-driven decision-making, policy development, strategic planning, and investment. The goal of the product is to provide the most relevant labor market analysis and industry projections for LWIBs in a standardized format agreeable to LWIB preferences for style, content, and format.

#### Next Steps

The EDD-LMID will continue to work with Steve Levy to develop the Regional Planning Information product to better suit the preferences and organizational goals of LWIBs. The EDD-LMID will also continue to work with Steve Levy to convene a group of technical experts and stakeholders to develop a regional framework and California-specific industry cluster definitions. The EDD-LMID has also reorganized to create a production unit for these products – the Regional Analysis and Support Group – and will continue to develop the capacity to begin production on these products for all interested LWIB partners. The EDD-LMID is tentatively aiming to begin production of these products by early next year.

Sincerely,



Spencer Wong, Chief  
Labor Market Information Division

# REGIONAL PLANNING INFORMATION



Alameda  
Contra Costa  
Marin  
Santa Clara

San Francisco  
San Mateo  
Solano

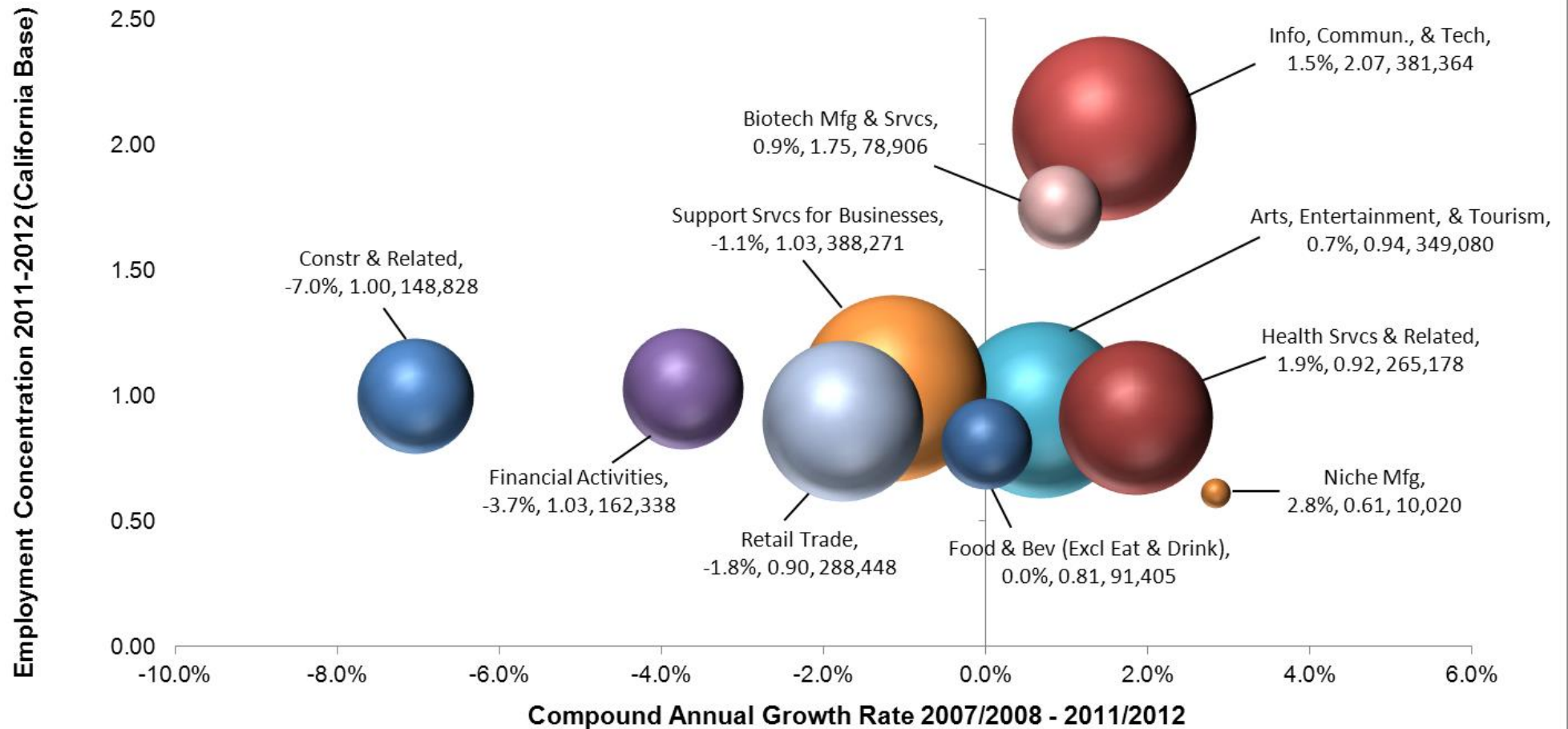


Draft  
July 2013



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# South Bay Region Industry Clusters of Opportunity



**Compound Annual Growth Rate (X-axis):** The smoothed annualized gain of an industry group.

**Employment Concentration (Y-axis):** Ratio of an area's employment by industry group compared to the base.

**Bubble Size:** Employment size.

**Data Sources:** Bureau of Labor Statistics; EDD Labor Market Information Division

The three numbers underneath each industry cluster title represent the compound average growth rate, the employment concentration, and the employment size.

## Industry Cluster Descriptions for the South Bay Region (Includes Alameda, Contra Costa, Marin, Santa Clara, San Francisco, San Mateo, and Solano Counties)

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The **Arts, Entertainment, and Tourism** industry cluster includes cultural, entertainment, and recreational establishments employing 349,080 people as of fiscal year 2011-2012, across the seven-county Bay Area region. Firms in this industry cluster provide transportation, entertainment, accommodation, and food service and drinking places. They include:

- scheduled air transportation,
- scenic and sightseeing transportation by land, water, and other,
- motion picture and video industries,
- amusement parks, arcades, and recreation,
- traveler accommodation,
- drinking places, and
- restaurants and other eating places.

The **Biotech Manufacturing and Services** industry cluster includes firms whose primary activity is biotechnology. It excludes public-sector jobs related to this cluster, such as at major universities, as well as lab instrument manufacturing, drug wholesalers, and testing and medical labs. For fiscal year 2011-2012, this industry cluster comprised 3.1 percent of the region's employment, or 78,906 jobs. The detailed industries included are:

- pharmaceutical and medicine manufacturing,
- medical equipment and supplies manufacturing, and
- scientific research and development services.

The **Construction** industry cluster includes firms focused on physical infrastructure of communities. The cluster serves the area's needs for housing and commercial structures, as well as roadways and utilities. Building equipment contractors, together with residential building construction and building finishing contractors, accounted for just over half (75,422 jobs) of the total employment (148,828 jobs) in the Construction industry cluster as of fiscal year 2011-2012. It also includes:

- nonmetallic mineral mining and quarrying,
- other wood product manufacturing, such as wood windows, doors, and flooring,
- cement and concrete product manufacturing,
- lumber and other construction materials wholesalers, and
- building material and supplies dealers.

The **Financial Activities** industry cluster provided 162,338 jobs as of fiscal year 2011-2012 among businesses involved in banking, investment, other financial transactions, insurance, real estate, and rental and leasing activities. About half of the jobs relate to the finance portion of the cluster.

## Industry Cluster Descriptions for the South Bay Region (Includes Alameda, Contra Costa, Marin, Santa Clara, San Francisco, San Mateo, and Solano Counties)

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The **Food and Beverage (Excluding Eating and Drinking)** industry cluster includes firms whose primary activity is growing crops, raising or harvesting animals, food manufacturing, and point-of-sale stores. It excludes restaurants and other eating and drinking establishments. Employment stood at 91,405 people as of fiscal year 2011-2012 across the seven-county Bay Area region. Some detailed industries include:

- fruit and tree nut farming,
- support activities for crop production,
- bakeries and tortilla manufacturing,
- sugar and confectionary product manufacturing,
- grocery stores, and
- other specialty food stores.

The **Health Services and Related** industry cluster includes private health care providers and other private health related services employing 265,178 people as of fiscal year 2011-2012. Firms in this industry cluster primarily provide health care services and health products for individuals. They include:

- health and personal care stores,
- offices of physicians, dentists, and other health practitioners,
- outpatient care centers and home health care services,
- general medical and surgical hospitals,
- nursing care facilities, and
- community care facilities for the elderly.

The **Information and Communication Technologies** industry cluster contains most of the primary industries included in the 2010 Environmental Scan by the Mid-Pacific Information and Communication Technologies Center and the Centers of Excellence, as well as the secondary industries of semiconductor and other electronic component manufacturing and electronic wholesalers due to their importance to the industry and the South Bay. The cluster provided 381,364 jobs as of fiscal year 2011-2012, with 30 percent of that employment in computer systems design and related services and close to 14 percent in the semiconductor manufacturing part noted below. Ranked by the number of Bay Area jobs, the largest parts of this cluster include:

- computer systems design and related services,
- semiconductor and other electronic component manufacturing,
- computer and peripheral equipment manufacturing,
- Internet publishing, Web search portals, and other information services,
- software publishers, and
- professional and commercial equipment and supplies wholesalers.



## Industry Cluster Descriptions for the South Bay Region (Includes Alameda, Contra Costa, Marin, Santa Clara, San Francisco, San Mateo, and Solano Counties)

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The **Niche Manufacturing** industry cluster includes smaller, specialized producers employing 10,020 people as of fiscal year 2011-2012. Firms in this industry cluster provide products primarily for utilization in construction and other manufacturing operations. They include:

- iron and steel mills and ferroalloy manufacturing,
- fabricated metals such as shipping containers, valves, and pipe fittings,
- machinery manufacturing including ventilation, heating, air-conditioning and commercial refrigeration equipment, engine equipment and other general purpose machinery manufacturing, and
- electric lighting and electrical equipment manufacturing.

The **Retail Trade** industry cluster includes firms engaged in retailing merchandise. It accounted for 288,448 jobs in fiscal year 2011-2012 and provides many replacement job openings over time. The types of stores with the largest employment in the Bay Area are grocery, department, and clothing stores.

The **Support Services for Businesses** industry cluster includes firms performing support activities for other establishments. Computer systems design was not included in this cluster but was moved to the cluster of Information and Communication Technologies. Scientific research and development was not included in this business cluster either, instead moved to the Biotech Manufacturing and Services cluster. For fiscal year 2011-2012, the industry cluster comprised of 388,271 jobs. Some of the larger sub-industries include:

- management of companies and enterprises,
- employment services,
- services to building and dwellings,
- management, scientific, and technical consulting services,
- architectural, engineering, and related services, and
- legal services.

# Summary of South Bay Region Industry Clusters and Selected Sub-Clusters

## May 2013

Total, Cluster, or Indented Sub-Clusters	Average Employment	Average Annual Growth Rate	Average Annual Wages	Employment Concentration*	Percent of Regional Employment
Total (Comprises All Industries Including Those Shown Below)	2,585,411	-0.9%	\$78,513	1.00	100.0%
Arts, Entertainment, and Tourism	349,080	0.7%	\$30,724	0.94	13.5%
Restaurants and Eating Places	202,753	0.8%	\$19,878	0.95	7.8%
Biotech Manufacturing and Services	78,906	0.9%	\$136,337	1.75	3.1%
Construction	148,828	-7.0%	\$63,873	1.00	5.8%
Financial Activities	162,338	-3.7%	\$115,468	1.03	6.3%
Food and Beverage (Excluding Eating and Drinking)	91,405	0.0%	\$35,888	0.81	7.1%
Grocery Stores	54,830	-0.4%	\$30,131	0.92	2.1%
Health Services and Related	265,178	1.9%	\$71,349	0.92	10.3%
General Hospitals	64,053	-7.3%	\$94,339	0.88	2.5%
Information and Communication Technologies (ICT)	381,364	1.5%	\$159,772	2.07	14.8%
ICT Manufacturing	116,130	-0.2%	\$174,190	2.79	4.5%
Computer Systems Design	115,968	3.8%	\$148,045	2.52	4.5%
Niche Manufacturing	10,020	2.8%	\$77,663	0.61	0.4%
Retail Trade	288,448	-1.8%	\$38,127	0.90	11.2%
Support Services for Businesses	388,271	-1.1%	\$84,970	1.03	15.0%
Management of Companies and Enterprises	59,231	0.7%	\$128,428	1.43	2.3%
Employment Services	53,918	-3.8%	\$56,682	0.72	2.1%
Services to Buildings and Dwellings	46,027	-0.1%	\$32,911	1.12	1.8%
Management, Scientific, and Technical Consulting Services	45,772	3.1%	\$104,453	1.18	1.8%
Architectural, Engineering, and Related Services	39,688	-3.4%	\$103,836	1.19	1.5%

All of the above data are for the fiscal year 2011-2012 except for the average annual growth rate, which covers the four-year period ending in that fiscal year.

\* Ratio of the region's employment by industry cluster compared to California's share; a number higher than 1.0 means it has a higher concentration in the region than in the State.

The South Bay Region comprises the counties of Alameda, Contra Costa, Marin, Santa Clara, San Francisco, San Mateo, and Solano Counties.



# OCCUPATIONAL ANALYSIS: BIOTECHNOLOGY



Alameda  
Contra Costa  
Marin  
Santa Clara

San Francisco  
San Mateo  
Solano

Draft  
July 2013

## What is Biotechnology?

Biotechnology encompasses a wide range of products and processes. From drugs and medical devices to biofuels and agricultural products, biotechnology applies to almost every facet of our daily life.

Biotechnology can be defined simply as “the application of science and technology to living organisms.”<sup>1</sup> As a cutting edge field, biotechnology has enabled us to make discoveries toward curing diseases, saving lives, feeding the world, finding alternative energy sources, developing green manufacturing technology, and much more.

## Key Occupations in Biotechnology

Biotechnology occupations play an important role in the effort to develop and implement innovative technologies that transform California’s economic and scientific growth. The following table identifies the top 20 key occupations in Biotechnology and includes the statewide projected percent and numerical change<sup>2</sup> for 2010-2020. Some of the common skills among these occupations include active learning, active listening, critical thinking, reading comprehension, and speaking.<sup>3</sup>

20 Key Occupations in Biotechnology	
<ul style="list-style-type: none"><li>Biochemists and Biophysicists (36.9% or 1,400 Jobs)</li><li>Biological Technicians (16.4% or 100 Jobs)</li><li>Biomedical Engineers (74.2% or 2,300 Jobs)</li><li>Chemical Engineers (33.3% or 200 Jobs)</li><li>Chemists (11.1% or 600 Jobs)</li><li>Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transportation (25% or 400 Jobs)</li><li>Computer Software Engineers, Systems Software (27.1% or 1,300 Jobs)</li><li>Electrical and Electronic Engineering Technicians (14.3% or 100 Jobs)</li><li>Electrical Engineers (27.3% or 300 Jobs)</li><li>Electronics Engineers, Except Computer (26.9% or 700 Jobs)</li></ul>	<ul style="list-style-type: none"><li>Engineering Managers (11.9% or 500 Jobs)</li><li>Materials Scientists (40% or 200 Jobs)</li><li>Mechanical Engineers (20.8% or 500 Jobs)</li><li>Medical Scientists, Except Epidemiologists (39.5% or 4,700 Jobs)</li><li>Microbiologists (25% or 500 Jobs)</li><li>Natural Sciences Managers (15.9 % or 700 Jobs)</li><li>Operations Research Analysts (25% or 100 Jobs)</li><li>Soil and Plant Scientists (28.6% or 200 Jobs)</li><li>Statisticians (16.7% or 100 Jobs)</li><li>Technical Writers (16.7% or 100 Jobs)</li></ul>

Source: California Employment Development Department, Projections of Employment 2010-2020.

## Employers in Biotechnology

The table below lists some of the region’s employers with the most advertised job postings for the Biotechnology-related occupations during the 120-day period ending 6/12/13.

10 Regional Employers in Biotechnology	
<ul style="list-style-type: none"><li>Genentech (Solano, San Mateo)</li><li>Cisco (Santa Clara)</li><li>University of California (Alameda, San Francisco)</li><li>Roche (Alameda, San Francisco, San Mateo)</li><li>Intel (Santa Clara)</li></ul>	<ul style="list-style-type: none"><li>Gilead (San Mateo)</li><li>Nvidia (Santa Clara)</li><li>Intuitive Surgical (Santa Clara)</li><li>Kaiser Permanente (All Counties)</li><li>Onyx Pharmaceuticals (San Mateo)</li></ul>

Source: The Conference Board Help Wanted OnLine™ (HWOL) data series

<sup>1</sup> “Statistical Definition of Biotechnology,” Organisation for Economic Co-operation and Development (OECD), <<http://www.oecd.org>>, accessed on January 23, 2013.

<sup>2</sup> Numerical change is the net difference between 2010-2020 total job openings.

<sup>3</sup> U.S. Department of Labor’s [Occupational Information Network \(O\\*NET\)](http://www.onetonline.org) at [www.onetonline.org](http://www.onetonline.org).

## Supply and Demand in Biotechnology

The table below describes the current supply and demand for the 20 key Biotechnology occupations, which may be present in all industries. It includes an estimate of employable candidates for California and the region, as well as the number of employers who are hiring now and have hired in the past four years. Posting periods greater than 40 days in length usually indicate hard-to-fill occupations.

Biotechnology	California	South Bay Region	Share of CA
Estimated Candidate Supply <sup>4</sup>	336,000	121,000	36%
Employers Advertising	2,661	1,225	46%
Number of Employers Who Have Advertised in the Past Four Years	19,412	8,712	45%
Average Posting Period	48 days	51 days	N/A

Source: The Conference Board Help Wanted OnLine™ (HWOL) data series- Supply/Demand Ratios: Date accessed 6/12/13.

## Key Support Occupations

In the Biotechnology industry, workers in support occupations are also essential to meet the functional and economic goals of the firm. The following table identifies the top 20 key support occupations in Biotechnology and includes the statewide projected percent and numerical change<sup>5</sup> for 2010-2020. Some of the common skills among these occupations include reading comprehension, critical thinking, active listening, speaking, and monitoring. And while the extent of skill needed to perform support occupations is often lower than many of the core Biotechnology jobs, it does suggest a potential for staff development and skills transferability with additional training and education.

20 Key Support Occupations in Biotechnology	
<ul style="list-style-type: none"> <li>Bookkeeping, Accounting, and Auditing Clerks (9.1% or 200)</li> <li>Customer Service Representatives (8.7% or 200 Jobs)</li> <li>Executive Secretaries and Administrative Assistants (15.2% or 700 Jobs)</li> <li>Human Resources Assistants, Except Payroll and Timekeeping (100% or 100 Jobs)</li> <li>Industrial Machinery Mechanics (16.7% or 100 Jobs)</li> <li>Laborers and Freight, Stock, and Material Movers, Hand (8.3% or 100 Jobs)</li> <li>Machinists (12.5% or 100 Jobs)</li> <li>Maintenance and Repair Workers, General (17.7% or 300 Jobs)</li> <li>Nonfarm Animal Caretakers (50% or 100 Jobs)</li> <li>Office Clerks, General (10% or 200 Jobs)</li> </ul>	<ul style="list-style-type: none"> <li>Packaging and Filling Machine Operators and Tenders (15.4% or 400 Jobs)</li> <li>Production, Planning, and Expediting Clerks (11.8 or 200 Jobs)</li> <li>Purchasing Agents, Except Wholesale, Retail, and Farm Products (15% or 300 Jobs)</li> <li>Receptionists and Information Clerks (16.7% or 100 Jobs)</li> <li>Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products (11.1% or 100 Jobs)</li> <li>Security Guards (100% or 100 Jobs)</li> <li>Social and Human Service Assistants (0% or 0 Jobs)</li> <li>Stock Clerks and Order Fillers (16.7% or 100 Jobs)</li> <li>Team Assemblers (0% or 0 Jobs)</li> <li>Truck Drivers, Light or Delivery Services (0% or 0 Jobs)</li> </ul>

Source: California Employment Development Department, Projections of Employment 2010-2020.

<sup>4</sup> According to The Conference Board, "The candidate supply is the total estimated employable workforce available for the job position entered, based on the Occupational Employment Survey (OES) of the Bureau of Labor Statistics (BLS) and the WANTED database, factoring in Monthly Employment Rates, Location Function, occupation, industry and keywords."

<sup>5</sup> Numerical change is the net difference between 2010-2020 total job openings.

## Key Occupations by Educational Requirement<sup>6</sup>

The following table identifies the top key occupations (based on statewide projected growth rate) by education requirement within Biotechnology. The table includes current demand by number of online job ads and percent change as compared to the same 120-day period from the previous year. The online job ads were extracted from The Conference Board Help Wanted OnLine™ (HWOL) data series, which compiles, analyzes, and categorizes job ads from numerous online job boards, including CalJOBS<sup>SM</sup> ([www.caljobs.ca.gov](http://www.caljobs.ca.gov)), California's Internet job listing system. The table also includes the statewide projected future employment and median annual wages.

Occupation	Biotechnology						
	Regional		California				
	Job Ads <sup>7</sup>	Year-Over Percent Change <sup>8</sup>	Employment (2010)	Employment (2020)	Numerical Change <sup>9</sup>	Percent Change	Median Annual Wage <sup>10</sup>
<b>Total, All Occupations</b>	26,337	-13.9%	197,500	230,400	32,900	16.6%	\$39,035
<b>Requires a Bachelor's Degree or Higher</b>							
Biomedical Engineers	92	-8.9%	3,100	5,400	2,300	74.2%	\$97,876
Materials Scientists	74	-17.8%	500	700	200	40%	\$92,999
Medical Scientists, Except Epidemiologists	3,173	-11.8%	11,900	16,600	4,700	39.5%	\$83,430
<b>Requires Some College, Postsecondary Non-Degree Award, or Associate's Degree</b>							
Electrical and Electronic Engineering Technicians	116	10.5%	700	800	100	14.3%	\$61,504
Computer Support Specialists	5,054	-4.4%	1,200	1,300	100	8.3%	\$55,910
Industrial Engineering Technicians	483	9.5%	600	600	0	0%	\$51,790
<b>Requires a High School Diploma or Equivalent or Less</b>							
Electromechanical Equipment Assemblers	73	-33%	300	400	100	33.3%	\$28,493
Inspectors, Testers, Sorters, Samplers, and Weighers	459	-24.6%	3,900	4,800	900	23.1%	\$44,949
Chemical Equipment Operators and Tenders	1	-50 %	1,300	1,600	300	23.1%	\$36,100

Source: California Employment Development Department, *Projections of Employment 2010-2020*. For more information on statewide and metro area projections, as well as estimated replacement openings, go to:

[http://www.labormarketinfo.edd.ca.gov/LMID/Projections\\_of\\_Employment\\_by\\_Industry\\_and\\_Occupation.html](http://www.labormarketinfo.edd.ca.gov/LMID/Projections_of_Employment_by_Industry_and_Occupation.html)

<sup>6</sup> U.S. Department of Labor's [Bureau of Labor Statistics \(BLS\)](http://www.bls.gov) education levels

<sup>7</sup> The Conference Board Help Wanted OnLine™ (HWOL) data series for Biotechnology: 120-day period ending 6/12/13.

<sup>8</sup> As compared to the same 120-day period from the previous year.

<sup>9</sup> Numerical change is the net difference between 2010 and 2020 total job openings

<sup>10</sup> Wage data are not industry-specific. The median is the point at which half of the workers earn more and half earn less. Wages do not reflect self-employment.

## Skill and Work Activity Requirements

This section examines the typical skill and work activity requirements for the Biotechnology-related occupations and highlights the top ten skills and work activities required for each occupation. Critical thinking and reading comprehension are the most common skills, followed by active listening and speaking. For work activities, updating and using relevant knowledge are the most common, followed by communicating with supervisors, peers, or subordinates; monitor processes, materials, or surroundings; organizing, planning, and prioritizing work; and process information. The skills and work activities identified for each occupation are from the O\*NET database. More extensive information is available at [www.onetonline.org](http://www.onetonline.org).

Occupation	Skills																			
	Active Learning	Active Listening	Complex Problem Solving	Coordination	Critical Thinking	Equipment Maintenance	Instructing	Judgment and Decision Making	Mathematics	Monitoring	Operation and Control	Operation Monitoring	Operations Analysis	Quality Control Analysis	Reading Comprehension	Science	Service Orientation	Speaking	Systems Analysis	Systems Evaluation
<b>Requires a Bachelor's Degree or Higher</b>																				
Biomedical Engineers	•	•	•		•			•	•				•		•	•		•		
Materials Scientists	•	•	•		•					•			•		•	•		•		•
Medical Scientists, Except Epidemiologists	•	•	•		•		•	•							•	•		•		•
<b>Requires Some College, Postsecondary Non-Degree Award, or Associate's Degree</b>																				
Electrical and Electronic Engineering Technicians <sup>11</sup>		•	•	•	•					•		•		•	•			•		•
Computer Support Specialists <sup>12</sup>	•	•		•	•		•			•					•		•	•		•
Industrial Engineering Technicians	•		•		•			•	•	•					•			•	•	•
<b>Requires a High School Diploma or Equivalent or Less</b>																				
Electromechanical Equipment Assemblers		•		•	•	•				•		•		•	•			•		•
Inspectors, Testers, Sorters, Samplers, and Weighers		•		•	•			•		•		•		•	•			•		•
Chemical Equipment Operators and Tenders		•		•	•			•		•	•	•		•	•					•

Source: U.S. Department of Labor's [Occupational Information Network \(O\\*NET\)](http://www.onetonline.org) at [www.onetonline.org](http://www.onetonline.org).

<sup>11</sup> Electrical and Electronics Engineering Technicians has been separated into two occupations; therefore, the skills relate to Electrical Engineering Technicians and Electronics Engineering Technicians.

<sup>12</sup> Skills are not available for Computer Support Specialists; therefore, this data relates to Computer User Support Specialists.

Occupation	Work Activities																			
	Analyzing Data or Information	Communicating with Supervisors, Peers, or Subordinates	Controlling Machines and Processes	Developing Objectives and Strategies	Documenting/Recording Information	Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment	Establishing and Maintaining Interpersonal Relationship	Evaluating Information to Determine Compliance with Standards	Getting Information	Handling and Moving Objects	Identifying Objects, Actions, and Events	Inspecting Equipment, Structures, or Material	Interacting With Computers	Interpreting the Meaning of Information for Others	Judging the Qualities of Things, Services, or People	Making Decisions and Solving Problems	Monitor Processes, Materials, or Surroundings	Organizing, Planning, and Prioritizing Work	Performing General Physical Activities	Processing Information
Requires a Bachelor's Degree or Higher																				
Biomedical Engineers	•								•		•			•		•	•	•		•
Materials Scientists	•								•		•			•		•	•	•		•
Medical Scientists, Except Epidemiologists	•	•					•		•		•						•	•		•
Requires Some College, Postsecondary Non-Degree Award, or Associate's Degree																				
Electrical and Electronic Engineering Technicians <sup>13</sup>		•					•	•		•	•					•		•		•
Computer Support Specialists <sup>14</sup>		•					•		•		•		•			•		•		•
Industrial Engineering Technicians	•	•		•		•	•										•	•		•
Requires a High School Diploma or Equivalent or Less																				
Electromechanical Equipment Assemblers		•	•				•			•		•					•	•		•
Inspectors, Testers, Sorters, Samplers, and Weighers		•					•		•	•	•				•		•	•		
Chemical Equipment Operators and Tenders		•	•		•			•		•						•	•		•	•

Source: U.S. Department of Labor's [Occupational Information Network \(O\\*NET\)](http://www.onetonline.org) at [www.onetonline.org](http://www.onetonline.org).

<sup>13</sup> Electrical and Electronics Engineering Technicians has been separated into two occupations; therefore, the work activities relate to Electrical Engineering Technicians and Electronics Engineering Technicians

<sup>14</sup> Work activities are not available for Computer Support Specialists; therefore, this data relates to Computer User Support Specialists.



## Related Occupations

This section provides a sampling of related occupations matched to key Biotechnology occupations.

Biotechnology Occupations	Related Occupations
<b>Requires a Bachelor's Degree or Higher</b>	
Biomedical Engineers	<ul style="list-style-type: none"> <li>Agricultural Engineers</li> <li>Chemical Engineers</li> <li>Environmental Engineers</li> </ul>
Materials Scientists	<ul style="list-style-type: none"> <li>Materials Engineers</li> <li>Chemists</li> <li>Geoscientists, Except Hydrologists and Geographers</li> </ul>
Medical Scientists, Except Epidemiologists	<ul style="list-style-type: none"> <li>Microbiologists</li> <li>Dietitians and Nutritionists</li> <li>Biological Science Teachers, Postsecondary</li> </ul>
<b>Requires Some College, Postsecondary Non-Degree Award, or Associate's Degree</b>	
Electrical and Electronic Engineering Technicians <sup>15</sup>	<ul style="list-style-type: none"> <li>Mechanical Engineering Technicians</li> <li>Avionics Technicians</li> <li>Electrical and Electronics Repairers, Commercial and Industrial Equipment</li> </ul>
Computer Support Specialists <sup>16</sup>	<ul style="list-style-type: none"> <li>Computer Operators</li> <li>Desktop Publishers</li> <li>Computer, Automated Teller, and Office Machine Repairers</li> </ul>
Industrial Engineering Technicians	<ul style="list-style-type: none"> <li>Civil Engineering Technicians</li> <li>Commercial and Industrial Designers</li> <li>Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic</li> </ul>
<b>Requires a High School Diploma or Equivalent or Less</b>	
Electromechanical Equipment Assemblers	<ul style="list-style-type: none"> <li>Engine and Other Machine Assemblers</li> <li>Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders</li> <li>Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic</li> </ul>
Inspectors, Testers, Sorters, Samplers, and Weighers	<ul style="list-style-type: none"> <li>Print Binding and Finishing Workers</li> <li>Team Assemblers</li> <li>Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic</li> </ul>
Chemical Equipment Operators and Tenders	<ul style="list-style-type: none"> <li>Hazardous Materials Removal Workers</li> <li>Chemical Plant and System Operators</li> <li>Gas Compressor and Gas Pumping Station Operators</li> </ul>

Source: U.S. Department of Labor's [Occupational Information Network \(O\\*NET\)](http://www.onetonline.org) at [www.onetonline.org](http://www.onetonline.org).

<sup>15</sup>Electrical and Electronics Engineering Technicians has been separated into two occupations; therefore, the occupations are related to Electrical Engineering Technicians and Electronics Engineering Technicians

<sup>16</sup>Related occupations are not available for Computer Support Specialists; therefore, this data relates to Computer User Support Specialists.

## Instructional Programs<sup>17</sup>

The first table below identifies the top five instructional programs, by number of awards/degrees conferred in 2011, within the region's California Community Colleges, California State Universities, and the Universities of California. The second table lists instructional programs for the 20 key Biotechnology-related occupations.

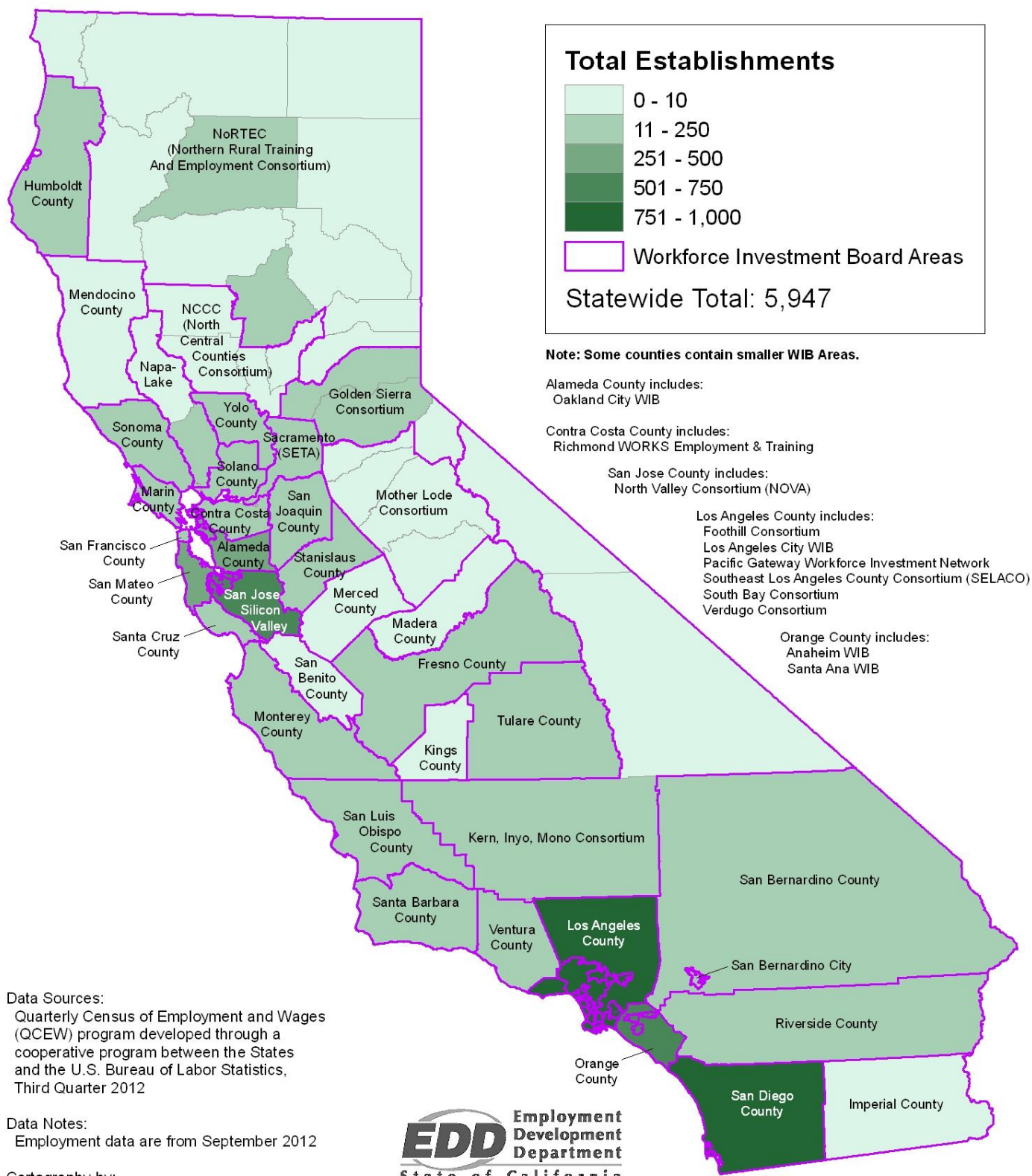
Top Five Instructional Programs	Greater Bay Area College Institutions
<b>California Community Colleges</b> ( <i>Associates Degrees and Certificates Below a Bachelor's</i> )	
<ul style="list-style-type: none"> <li>Liberal Arts and Sciences, General Studies and Humanities (2,711 Awards)</li> <li>Health Professions and Related Programs(1,760 Awards)</li> <li>Business, Management, Marketing, and Related Support Services (1,272 Awards)</li> <li>Family and Consumer Sciences/Human Sciences(1,227 Awards)</li> <li>Social Sciences (752 Awards)</li> </ul>	<ul style="list-style-type: none"> <li>Berkeley City College</li> <li>Canada College</li> <li>Chabot College</li> <li>City College of San Francisco</li> <li>College of Alameda</li> <li>College of Marin</li> <li>College of San Mateo</li> <li>Contra Costa College</li> <li>Diablo Valley College</li> <li>Laney College</li> <li>Las Positas College</li> <li>Los Medanos College</li> <li>Merritt College</li> <li>Ohlone Community College</li> <li>Skyline College</li> </ul>
<b>California State Universities</b> ( <i>Bachelor's and Master's Degrees, Doctorates</i> )	
<ul style="list-style-type: none"> <li>Business, Management, Marketing, and Related Support Services (4,708 Awards)</li> <li>Health Professions and Related Programs (1,549 Awards)</li> <li>Education (1,502 Awards)</li> <li>Social Sciences (1,461 Awards)</li> <li>Engineering (1,274 Awards)</li> </ul>	<ul style="list-style-type: none"> <li>Sonoma State</li> <li>California Maritime Academy</li> <li>San Francisco State</li> <li>CSU East Bay</li> <li>San Jose State</li> </ul>
<b>Universities of California</b> ( <i>Bachelor's and Master's Degrees, Certificates above a Bachelors, Doctorates</i> )	
<ul style="list-style-type: none"> <li>Social Sciences (1,628 Awards)</li> <li>Engineering (1296 Awards)</li> <li>Health Professions and Related Programs (1,296 Awards)</li> <li>Biological and Biomedical Sciences (1,136 Awards)</li> <li>Business, Management, Marketing, and Related Support Services (988 Awards)</li> </ul>	<ul style="list-style-type: none"> <li>UC Berkeley</li> <li>UC San Francisco</li> </ul>

Instructional Programs for Key Biotechnology Occupations
<b>Classification of Instructional Programs</b>
<ul style="list-style-type: none"> <li>01.1201 - Soil Science and Agronomy, General</li> <li>14.0501 - Bioengineering and Biomedical Engineering</li> <li>14.0702 - Chemical and Biomolecular Engineering</li> <li>14.1001 - Electrical and Electronics Engineering</li> <li>14.1901 - Mechanical Engineering</li> <li>14.3701 - Operations Research</li> <li>14.4501 - Biological/Biosystems Engineering</li> <li>26.0202 - Biochemistry</li> <li>26.1102 - Biostatistics</li> <li>40.1001 - Materials Science</li> <li>41.0101 - Biology Technician/Biotechnology Laboratory Technician</li> </ul>
<b>Taxonomy of Programs (California Community Colleges Only)</b>
<ul style="list-style-type: none"> <li>040300 - Microbiology</li> <li>041000 - Anatomy and Physiology</li> <li>060700 - Technical Communication</li> <li>070200 - Computer Information Systems</li> <li>170100 - Mathematics, General</li> <li>190500 - Chemistry, General</li> </ul>

<sup>17</sup> U.S. Department of Education [Integrated Postsecondary Education Data System \(IPEDS\)](http://nces.ed.gov/ipeds/) at [www.nces.ed.gov](http://www.nces.ed.gov)

# California Biotech Manufacturing & Services

Third Quarter, 2012



**Data Sources:**  
Quarterly Census of Employment and Wages (QCEW) program developed through a cooperative program between the States and the U.S. Bureau of Labor Statistics, Third Quarter 2012

**Data Notes:**  
Employment data are from September 2012

**Cartography by:**  
Labor Market Information Division  
California Employment Development Department  
<http://www.labormarketinfo.edd.ca.gov>  
August 2013

**EDD** Employment Development Department  
State of California

**LaborMarketInfo**